THE IMPORTANCE OF SOIL FAUNA IN REGULATING SOIL MICROSTRUCTURE AND SOIL MANAGEMENT IN FORESTS

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ABSTRACT

The effect of faunal activities on structure formation is most impressive in soils containing a dark humic horizon of the mull type (mollic epipedon). Especially in the transition zone to a brighter subsoil it can be shown, in which way aggregates of different origin are locally deposited, changed, and reincorporated in larger units or coherent areas. Shape and size make evident that various kinds of soil animals contribute to this cycling process, finally resulting in a complete contacting and mixing of organic and organic components and forming new mull.

In forest soils often the humic material does not reach the status of dark mull. In such cases it is often unclear how far the soil fauna is involved in the incorporation of organic substance into the soil. The study of thin sections by means of an incident light fluorescence-microscope can indicate that the transport and mixing effect in such soils is often underestimated. Small organic particles, unvisible with other microscopic techniques, can be observed also in subsoil areas. Their spatial distribution is not to explain merely by root growing and rotting processes.

In forest management two factors which are related to soil structure are of particular importance.

The use of heavy machinery leads to increasing problems of soil compaction. Depending from the soil properties and the climatic conditions hydromorphic features may be formed. Leaching will cause an instability of the binding forces and the regulating potential of the fauna is often repressed.

The other factor is acidity. The humus horizons of acid soils onto podzols (spodosols) are well known. It is obvious that the structure forming activities are strongly reduced. We have to take in account, that possibly the processes leading to acid soil conditions are much faster today than supposed before. Meliorative measures will be discussed.